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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/074,792	02/12/2002	Masaaki Hayama	MAT-6660US2	8079
	7590	05/12/2004	EXAMINER	
Ratner & Prstia P.O Box 980 Valley Forge, PA 19482			CHAMBLISS, ALONZO	
			ART UNIT	PAPER NUMBER
			2827	

DATE MAILED: 05/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/074,792

Applicant(s)

HAYAMA ET AL.

Examiner

Alonzo Chambliss

Art Unit

2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 March 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 13-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 13-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Amendment D filed on 5/1/04 has been fully considered and made of record in Paper No. 11.

Response to Arguments

2. Applicant's arguments filed 3/1/04 have been fully considered but they are not persuasive.

Applicant alleges that Hayama nor Saitou disclose **a ceramic substrate having a through hole with a conductive material therein and the second conductive pattern is electrically connected to the first conductive pattern by the via and the conductive material of the ceramic substrate is in contact with the via**. This argument is deemed unpersuasive because Hayama discloses a ceramic substrate 2 and the second conductive pattern 32 is electrically connected to the first conductive pattern 35 by the via (see English translation 90-11; Figs. 8 and 10-13). Saitou discloses a ceramic substrate 11 having a through hole 13 filled with an electroconductive material and the conductive material of the ceramic substrate 11 is in contact with the via (see col. 6 lines 36-68; Fig. 1). Thus, Hayama and Saitou have substantially the same environment of a insulating layer having openings filled with conductive material placed on a substrate. Therefore, it would have been obvious to one skilled in the art at the time of the invention to incorporate the substrate with a through hole with the device of Hayama, since the substrate with the through hole would

facilitate the substrate to be electrically connected from the bottom surface to an external electronic device as taught by Saitou.

In response to Applicant's argument that there is no suggestion to combine the references, the Examiner recognizes that references cannot be arbitrarily combined and that there must be some reason why one skilled in the art would be motivated to make the proposed combination of primary and secondary references. *In re Nomiya*, 184 USPQ 607 (CCPA 1975). However, there is no requirement that a motivation to make the modification be expressly articulated. The test for combining references is what the combination of disclosures taken, as a whole would suggest to one of ordinary skill in the art. *In re McLaughlin*, 170 USPQ 170 USPQ 209 (CCPA 1971). References are evaluated by what they suggest to one versed in the art, rather than by their specific disclosures. *In re Bozek*, 163 USPQ 545 (CCPA) 1969. In this case again Hayama and Saitou have substantially the same environment of a insulating layer having openings filled with conductive material placed on a substrate. Therefore, it would have been obvious to one skilled in the art at the time of the invention to incorporate the substrate with a through hole with the device of Hayama, since the substrate with the through hole would facilitate the substrate to be electrically connected from the bottom surface to an external electronic device as taught by Saitou.

In response to Applicant's argument that the Examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment of obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was

within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. *In re McLaughlin*, 443 F.2d 1392; 170 USPQ 209 (CCPA 1971).

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 13-30 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. In Claim 13, the phrase "said conductive material of said ceramic substrate being in contact with said via" is vague and indefinite since it is not clear from the claim how conductive material is in contact with the via. From the Fig. 1 the via is between element 11 and pattern 3 since a via means an opening created in a medium or solid material.

6. In claim 14, the phrase "said conductive material of said ceramic substrate being in contact with said via of the first conductive pattern" is vague and indefinite since it is not clear from the claim how conductive material is in contact with the via. From the Fig. 1 the via is between element 11 and pattern 3, 4, 5, etc. since a via means an opening created in a medium or solid material.

7. Claims 17 and 24 recite the limitation " a through hole " in line 2. There is insufficient antecedent basis for this limitation in the claim.

8. In Claims 17 and 24, the phrase " an electroconductive substance " is vague and indefinite since it is not clear from the claim if the electroconductive substance is the same as the conductive material or if there are two different conductive materials in the via.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims 13-30, are rejected under 35 U.S.C. 103(a) as being unpatentable over Hayama et al. (JP 7-169635) in view of Saitou et al. (U.S. 5,162,240).

With respect to Claims 13, 14, 17, and 24, Hayama teaches a ceramic substrate 2 with a first and third pattern 35 each having convex via, being formed on the ceramic substrate 2 by a transfer printing technology through an intaglio printing using a flexible resin substance. An insulation layer 33 is formed on the first conductive pattern 35 and a second and fourth conductive pattern 32, 34 each electrically connected with the first and third conductive pattern 35, respectively by the via (see English translation, paragraphs 90-111, Figs. 8 and 10-13). Hayama discloses that it is also possible to form the pit 22 or slot 21 which has a configurations other than a cylindrical shape (see English translation, paragraphs 44 and 45). Thus, Hayama is not limited to the shape seen in the figures but can have several different shapes without departing from the scope of the invention. Hayama discloses a convex via having a configuration other than a cylindrical shape (see English translation, paragraph 45). Thus, other configuration of the convex via would yield the same result as the cylindrical shape. Therefore, one skilled in the art at the time of the invention would readily recognize from Hayama that a step configuration having only two different widths can be substituted for a cylindrical shape via, since step configuration via would provide a fine pattern shape in the plate allowing for stable electrical connection through dielectric layers for the semiconductor substrate. With respect to Claims 17 and 24, Hayama fails to disclose the ceramic substrate provided with a through hole filled with an electroconductive substance and burned and the via is disposed on the via is disposed on the through hole. However, Saitou discloses the ceramic substrate 11 provided with a through hole 13 filled with an electroconductive substance and burned and the via 22 including a first

and second conductive material in contact with each other and disposed on the through hole. A first and second conductive material (see col. 6 lines 38-68; Fig. 1). Therefore, it would have been obvious to one skilled in the art at the time of the invention to incorporate the substrate with a through hole with the device of Hayama, since the substrate with the through hole would facilitate the substrate to be electrically connected from the bottom surface to an external electronic device as taught by Saitou.

With respect to Claims 15 and 22, Hayama teaches a meshed pattern is provided in a part of the conductive pattern (see Figs. 12 and 13).

With respect to Claims 16 and 23, Hayama teaches a shield pattern (i.e. the outer most pattern of the conductive pattern 35) is provided in a part of the conductive pattern 35 (see Fig. 13). Furthermore, any pattern on the outer most pad of conductive pattern 35 serves as a shield pattern, since this pattern shields the inner conductive patterns 35 from the outside periphery of the device.

With respect to Claims 18 and 25, Hayama teaches a dielectric layer 33 formed on a part of the ceramic substrate 2 (see Figs. 12 and 13).

With respect to Claims 19, 20, 26, and 27, Saitou discloses a LSI chip 30 mounted on a part of second conductive pattern directly bonded to pad 23, wherein the LSI chip 30 is face down electrically connected through an electroconductive paste 32 (i.e. solder) applied on the top of a fine bump provided on the second conductive pattern. The fine bump is the portion of the electroconductive substance that protrudes passes the top portion of the insulation material 21 (see col. 8 lines 34-42, Fig. 1). Hayama

discloses a fine bump formed by using a second groove 22, which is disposed on the intaglio 20 at a place corresponding to a pad of the LSI chip 30 taught by Saitou.

With respect to Claims 21 and 28, Saitou discloses an LSI package is mounted on part of the second conductive pattern face down and electrically connected through a lattice of lands with a pitch between terminals that is 220 micrometers (i.e. 200 micrometers = .2mm). The lattice is on the second conductive patterns (see col. 2 lines 17-25; Fig. 1).

With respect to Claims 29 and 30, Hayama discloses wherein the first conductive pattern 24 being a transfer of an intaglio plate 20 (see Figs. 5 and 8).

The prior art made of record and not relied upon is cited primarily to show the product of the instant invention.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

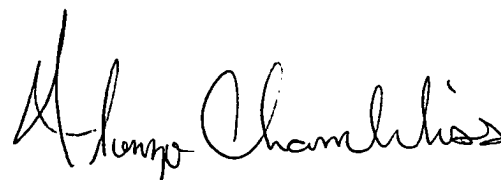
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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning the communication or earlier communications from the examiner should be directed to Alonzo Chambliss whose telephone number is (703) 306-9143. The fax phone number for this Group is (703) 308-7722 or 7724.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-7956

AC/May 10 2004

A handwritten signature in black ink, appearing to read "Alonzo Chambliss", with a stylized, cursive script.

Alonzo Chambliss
Primary Patent Examiner
Art Unit 2827